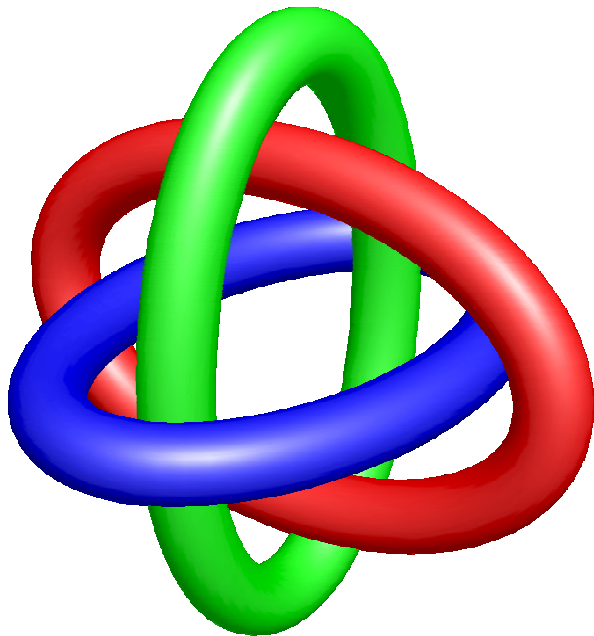


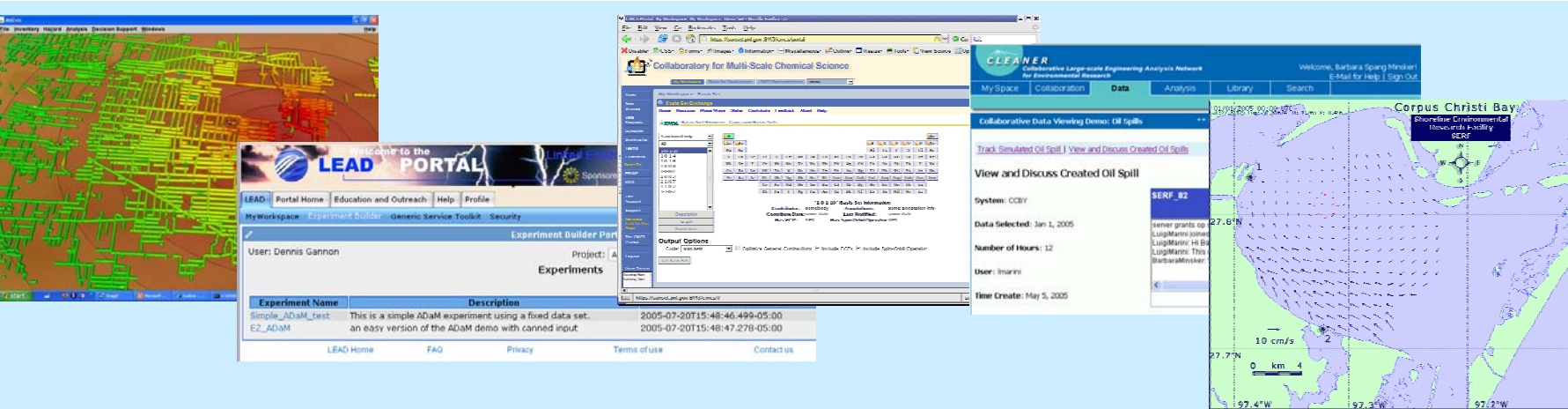
Supporting Community-scale
Science

Cyberenvironments @ NCSA



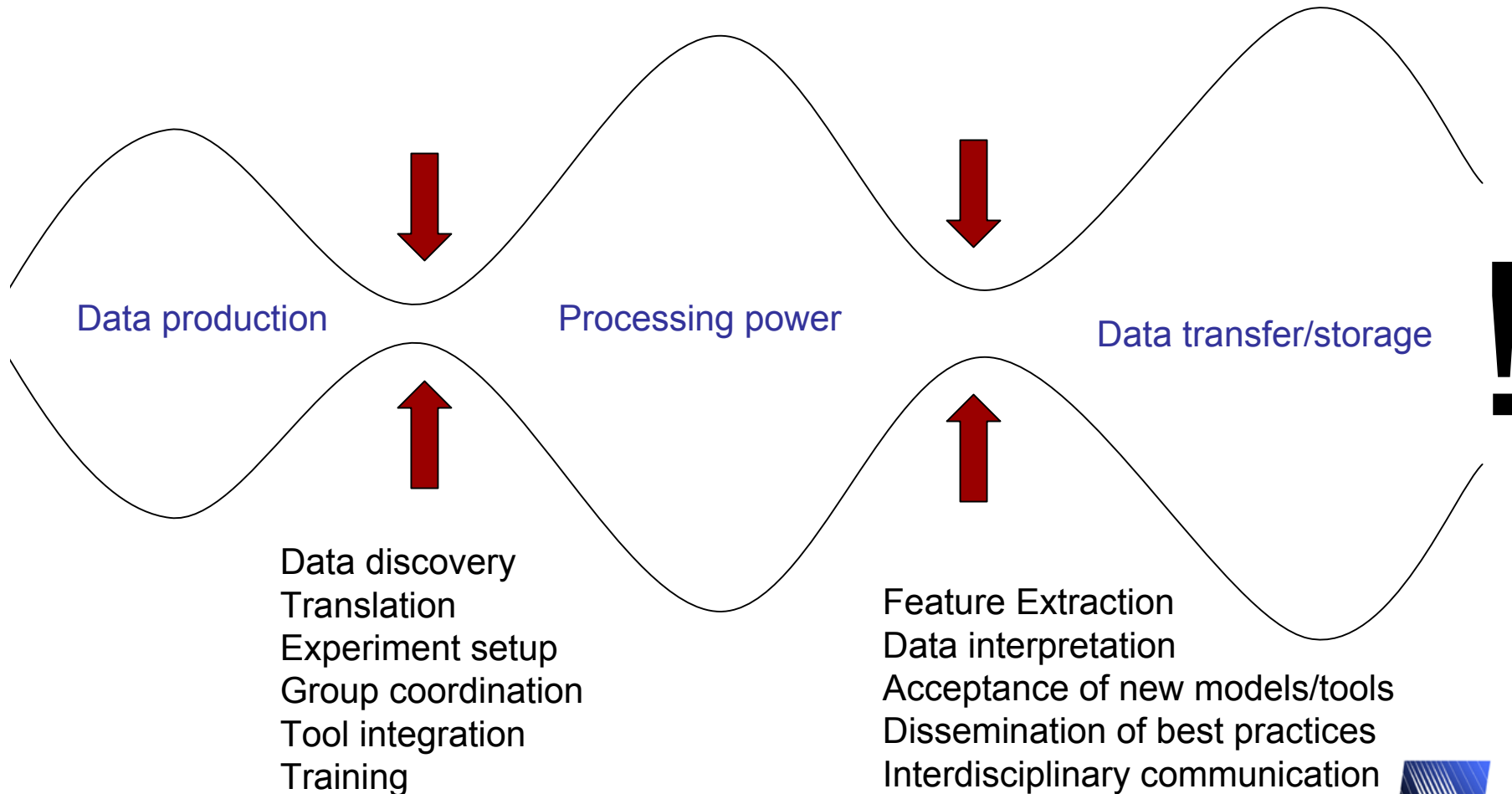
Jim Myers
Associate Director
Collaborative Technologies
NCSA

Cyberenvironments :



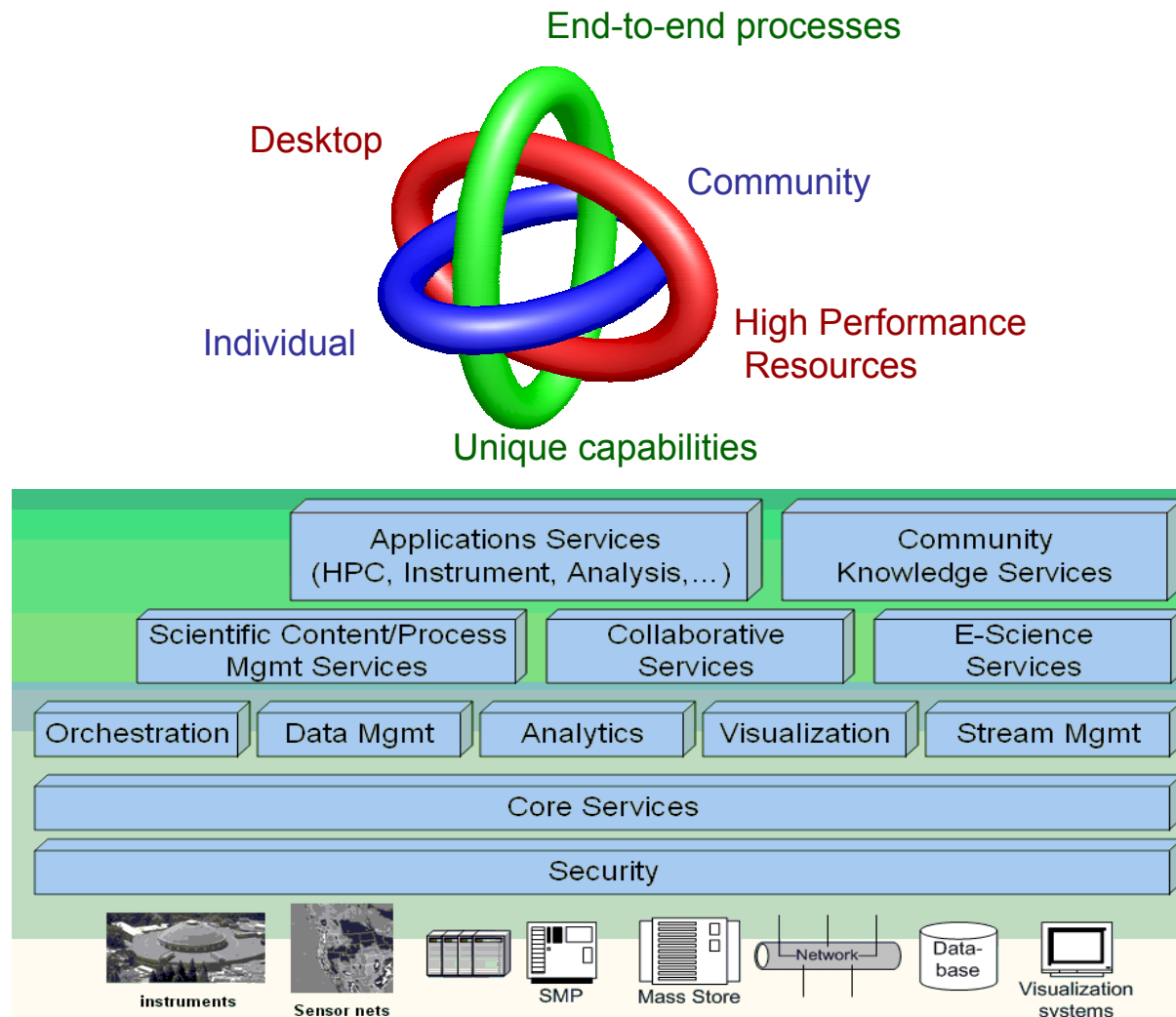
- Enable researchers to tackle more, and more complex challenges leading to
 - **Enhanced production of knowledge and**
 - **Enhanced application of that knowledge to understanding our world, developing solutions, and making informed decisions**

End to end Scientific Progress is limited by the manual processes:



Round-Trip Information Logistics

- Desktop applications accessing remote resources
- Individuals publishing to communities and accessing reference information, best practices, etc.
- Unique capabilities linked into end-to-end community processes
- Inter-community connectivity
- Evolving at the speed of science

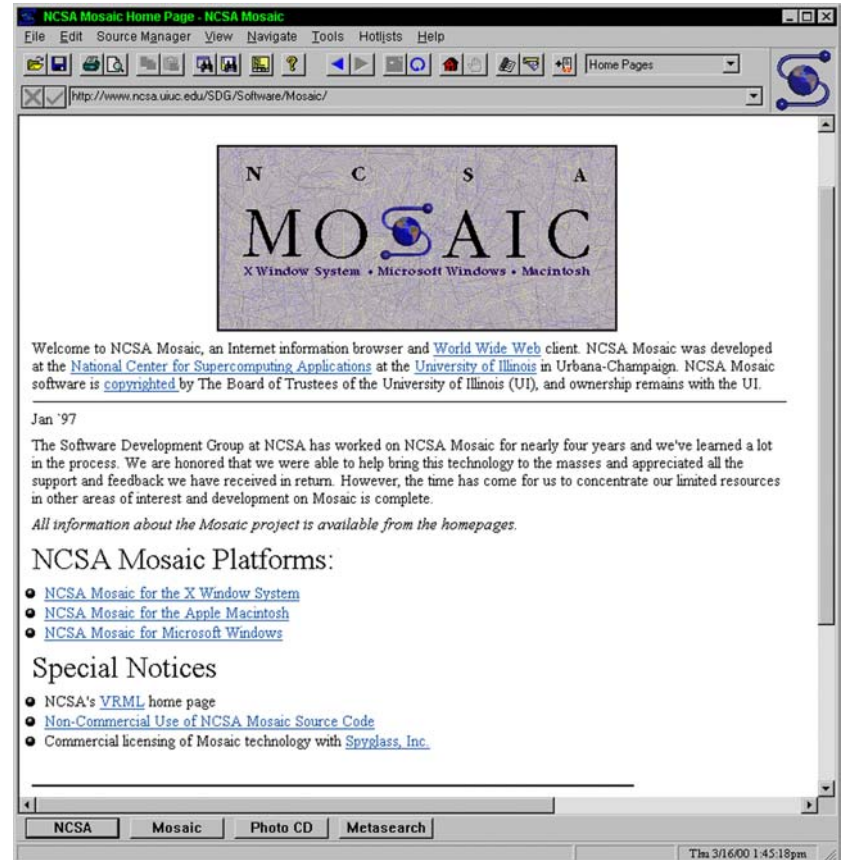


Key concepts

- Distributed Scientific Content & Process Mgmt
 - Tracking provenance
 - Context-based data discovery
 - Data translation/data virtualization
 - Base for knowledge services
- Workflow/Services
 - Ability to integrate independent web services
 - Ability to hide workflow behind applications
- Visual Analytics
 - Identification/Visualization of features/patterns from one domain in terms of another...
- Streaming/steering/event-driven science
 - Marshaling additional sensors for interesting phenomena
 - On-demand simulation
- Living Cyberenvironments
 - End-to-end, e.g. Engineering view of cutting-edge science
 - Community managed/evolved
 - Collaboration capabilities
 - Science lifecycle support – research, publication, curation, ...

Mosaic and Cyberenvironments

- Mosaic
 - By early 1990s, the internet had a wealth of resources, but they were inaccessible to most scientists
 - *Mosaic* facilitated the use of the internet by *all* scientists (and, eventually, by laymen!)
- Cyberenvironments
 - *Cyberenvironments* will facilitate the use of cyber-infrastructure by *all* scientists (laymen?)



NCSA

- Integrated project teams (IPTs) working with multiple communities to develop Cyberenvironments/CI
- A broad technology base moving to/in production
- Research in key areas for supporting systems-science/ab initio engineering/communities
- An active effort to synthesize experience with communities and apply it to the design of effective (“It’s all about the science!”) systems
- Contributing to and leveraging the national/global cyberinfrastructure vision

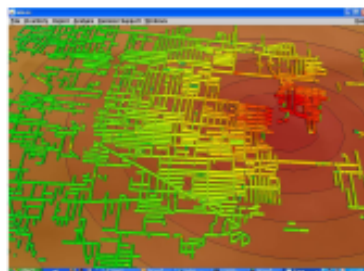
NCSA End-to-end Cyberenvironments



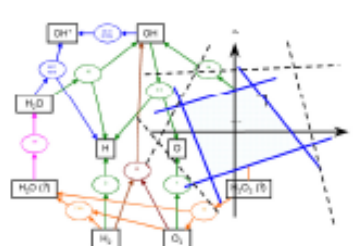
Researchers' ability to generate data, analyze and model it, and to share their results is increasing at an incredible rate, promising a revolution in scientific productivity. However, the advances in these areas are beginning to expose new bottlenecks in research processes that must be addressed to maximize the overall impact on scientific productivity.

NCSA and its collaborators are working with science and engineering communities to develop a new generation of cyberenvironments/ cyberinfrastructure that addresses end-to-end scientific productivity at the scope and scale required to address science and engineering grand challenges.

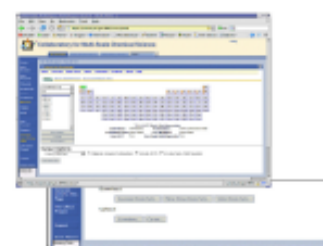
Engineering Views



Best practice/Gap analysis



Reference Data



Collaborative Services
e.g. Portal spaces,
peer review/curation
standardization

Reusable high-level functionality for
developing end-to-end cyberenvironments,
built upon the national cyberinfrastructure

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Publish
Share
Coordinate
Cure
Evaluate

Discover
Mine
Translate
use



Experiment setup



Distributed execution



Annotation



Provenance



Community cyberenvironments enrich the bi-directional flow of information between basic research and application, turning data into knowledge.

